Industrial Energy Efficiency and the Clean Power Plan

Tools for States

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Conference ID: 9151827#

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RAP Energy solutions for a changing world

Industrial Energy Efficiency and NACAA's "Implementing EPA's Clean Power Plan: A Menu of Options"

Industrial Energy Efficiency and the Clean Power Plan
Industrial Coordination Committee Webinar

July 31, 2015

Presented by Ken Colburn, Principal

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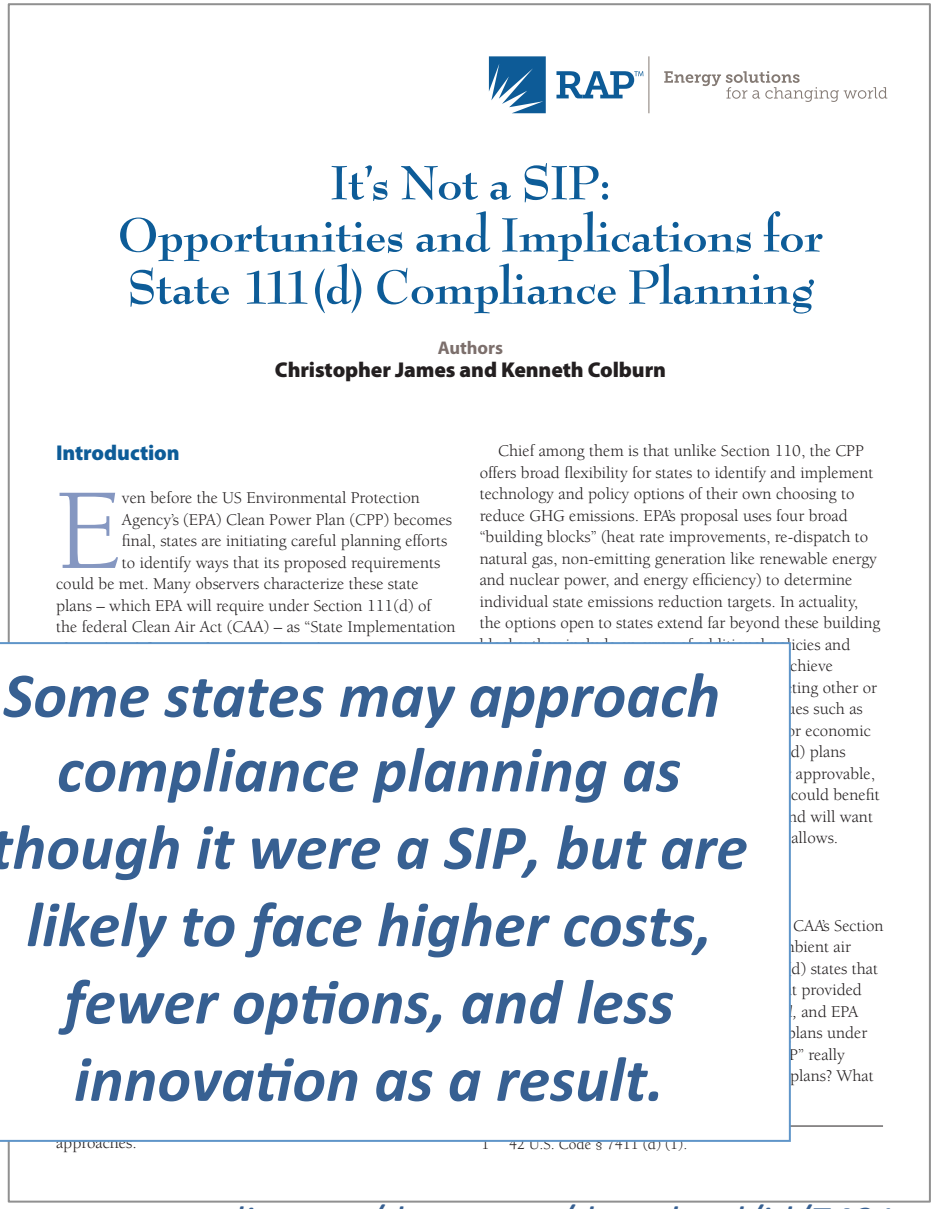
The CPP is a "Different Animal"

- "Similar" ≠ identical
  - Little state experience
  - Cost/useful life considerations
  - Measures, timing, contents of state plans
  - Multi-state options
  - Federal response when a state plan is deficient



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It's Not a SIP:
Opportunities and Implications for State 111(d) Compliance Planning

Authors
Christopher James and Kenneth Colburn

Introduction

Even before the US Environmental Protection Agency's (EPA) Clean Power Plan (CPP) becomes final, states are initiating careful planning efforts to identify ways that its proposed requirements could be met. Many observers characterize these state plans – which EPA will require under Section 111(d) of the federal Clean Air Act (CAA) – as "State Implementation

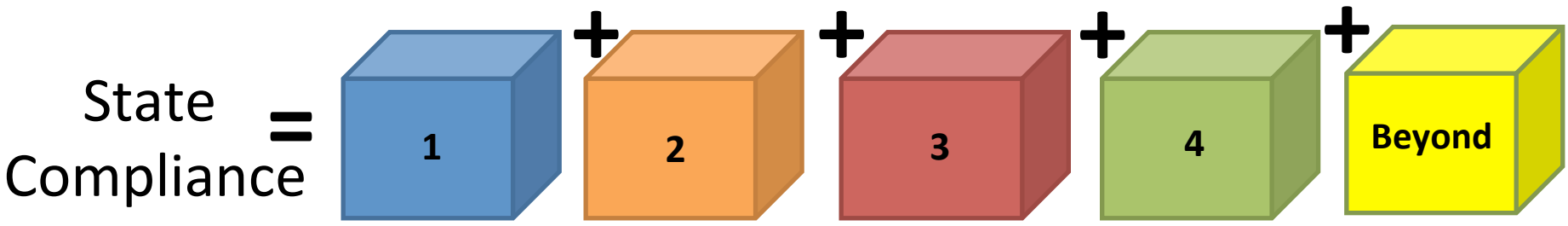
Chief among them is that unlike Section 110, the CPP offers broad flexibility for states to identify and implement technology and policy options of their own choosing to reduce GHG emissions. EPA's proposal uses four broad "building blocks" (heat rate improvements, re-dispatch to natural gas, non-emitting generation like renewable energy and nuclear power, and energy efficiency) to determine individual state emissions reduction targets. In actuality, the options open to states extend far beyond these building

Some states may approach compliance planning as though it were a SIP, but are likely to face higher costs, fewer options, and less innovation as a result.

www.raponline.org/document/download/id/7491

State CPP Compliance Plans: The Actual Opportunity

~~Conventional Wisdom:~~ **Actual Opportunity:**

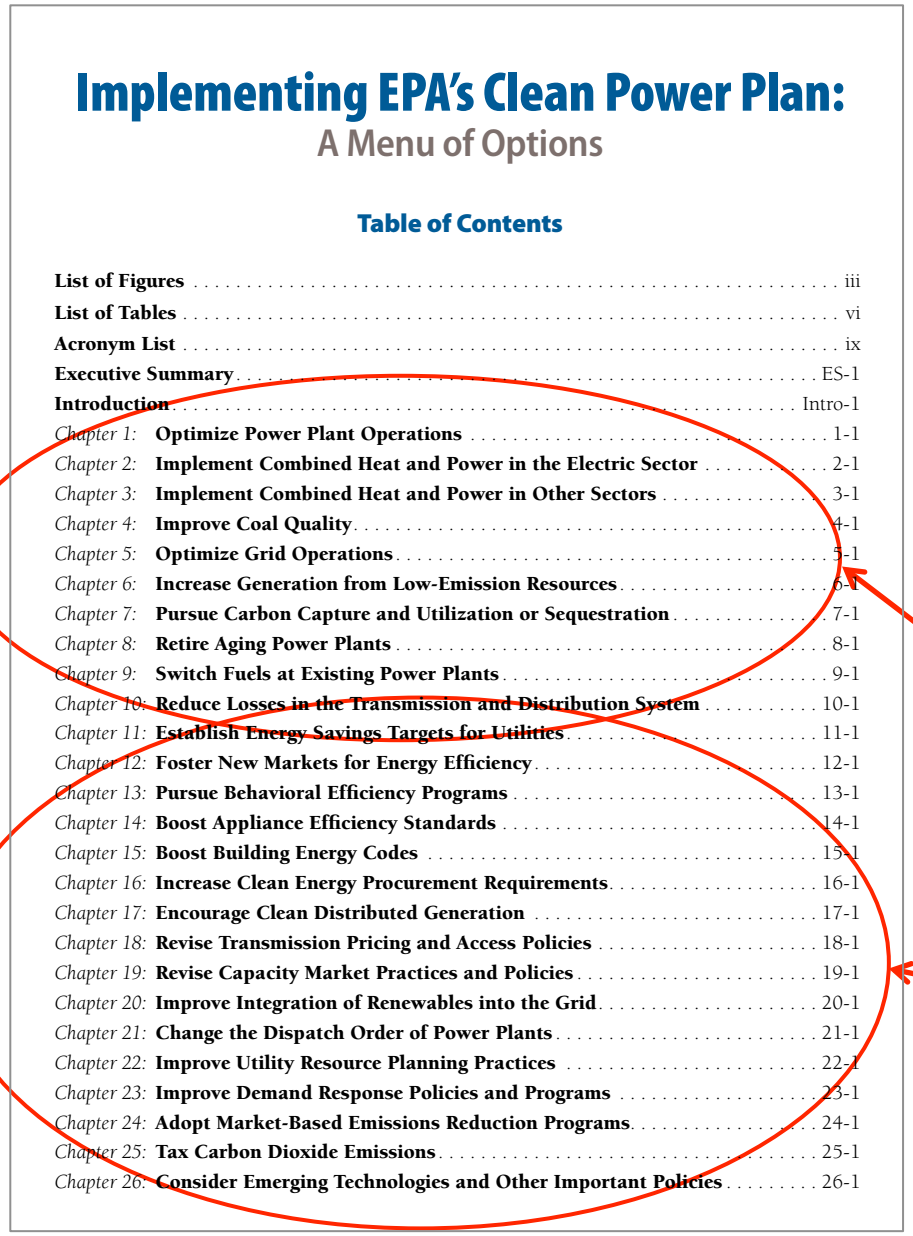


~~Each BB likely > 0~~

Some BBs *may* be zero

Keys:

- States can "think outside the blocks"!
- Better to seek 'approval' than to ask permission!



Implementing EPA's Clean Power Plan:
A Menu of Options

Table of Contents

NACAA's *Menu of Options*

(Released May 21,2015)

465 pages; ~20 pp/chapter

10 Chapters on Technology Options

15 Chapters on Policy Options

www.4cleanair.org/NACAA_Menu_of_Options

NACAA *Menu of Options*: Each Chapter Contents

- Profile (description, pros, cons, etc.)
- Regulatory Backdrop
- State & Local Implementation Experience
- GHG Emissions Reductions
- Co-Benefits
- Costs and Cost-Effectiveness
- Other Considerations
- For More Information
- Summary

Chapter 3: Implement CHP in Other Sectors

- CHP in the commercial, industrial, institutional, and manufacturing sectors
- Improves economic competitiveness
- Scalable; host-dependent
- Reliability, cost, multi-p, etc. benefits

Chapter 11: Establish Energy Savings Targets

- EE is a low-cost, low-risk resource
- Energy Efficiency Resource Standard (EERS) and other mechanisms reduce CO2 while stimulating job growth and state economies
- Generally ratepayer funded; significant potential

Chapter 12: Foster New Markets for EE

- Builds on Chapter 11 with voluntary, market-based
- Technology, operational, and behavioral changes for better service with lower energy consumption
- Audits, energy savings contracts, private EE, financial/tax incentives, labeling, ability to compete in wholesale marets

Chapter 17: Encourage Clean DG

- Facilities <20 MW connected to the dist. grid
- Encompasses solar PV, wind, biomass, anaerobic digestion, geothermal, fuel cell, and small CHP
- Also avoids some or all T&D line losses
- Is increasingly cost-competitive

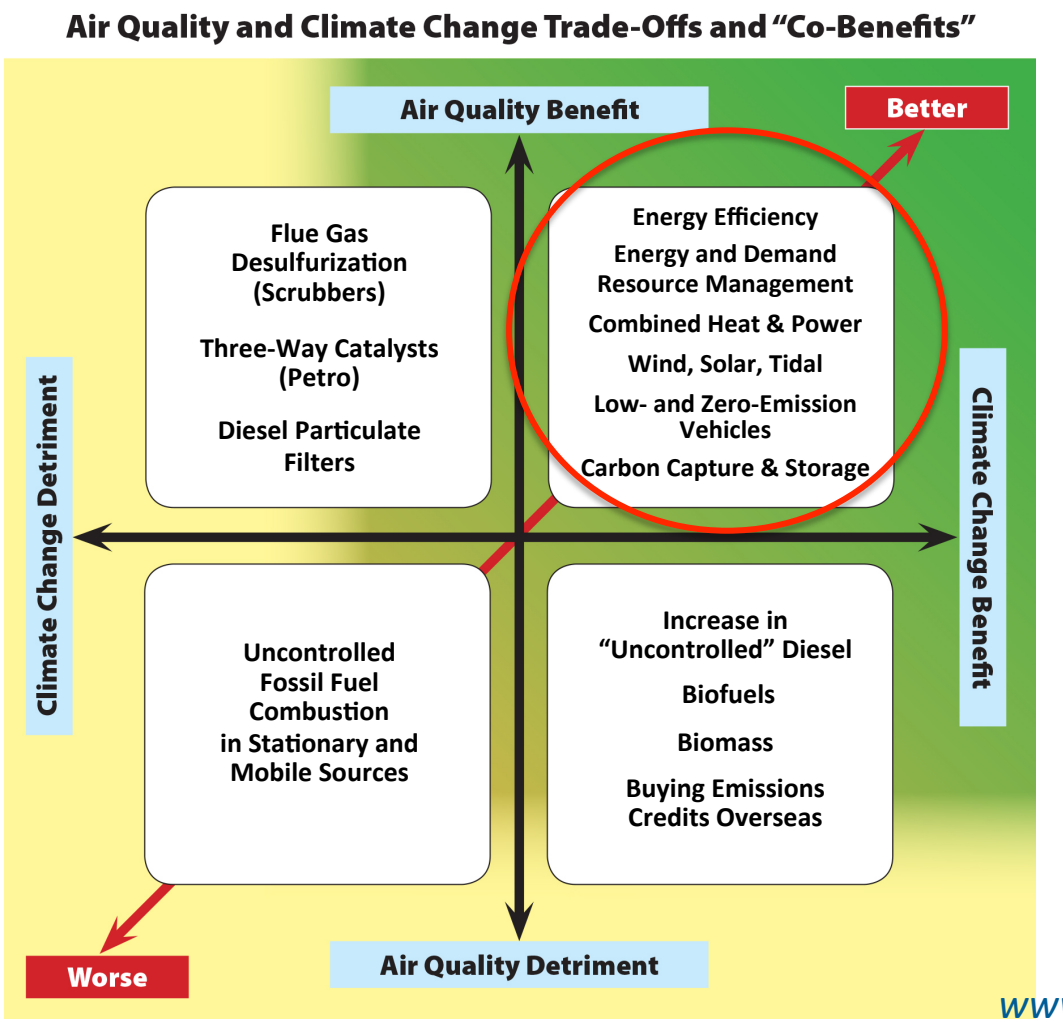
Chapter 23: Improve Demand Response (DR)

- Intentional modification of load by/for end-users
  First targeted peaks (via curtailment); now can provide ancillary services too (voltage regulation)
- Promote economic efficiency in wholesale markets
- Can reduce costs and facilitate RE integration

Chapter 26: Emerging Technologies & Policies

- Previous 25 chapters reflect existing options
- Power sector changing from 1-way analog to 2-way digital system
- Smart grid, "internet of things," storage, business models, EVs, aggregation, water-energy nexus, etc.
- *Future: Supply and demand will both be managed!*

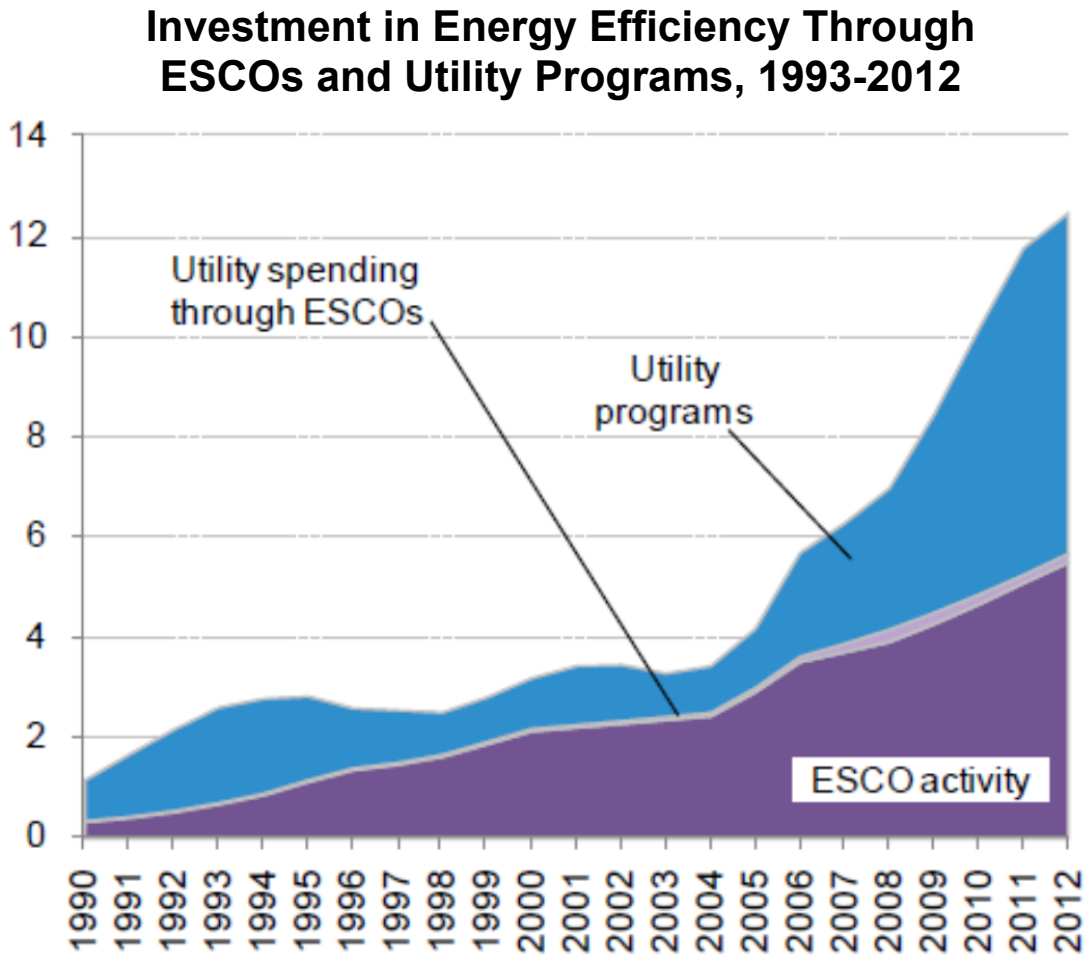
Consider Co-Benefits as Well as Carbon & Cost



- Good CPP choices can help air quality; good air quality choices can help CPP compliance
- Ditto for increasing ***water*** concerns
- Integrated multi-pollutant, multi-media approach can lower cost, risk (IMPEAQ)

www.raponline.org/document/download/id/6440

Privately-Delivered Energy Efficiency



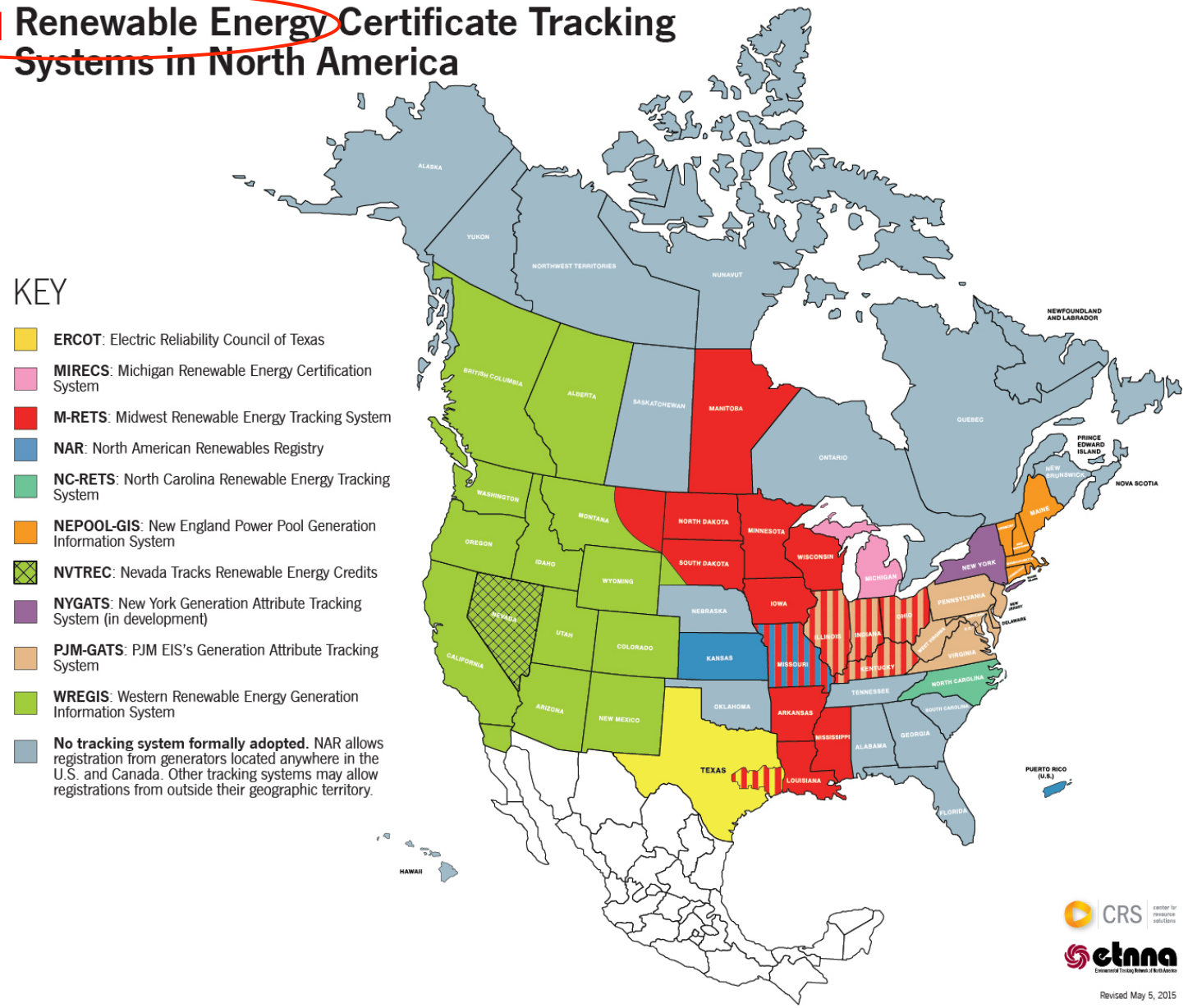
- Doesn't rely on state or utility investment
- ~$7B+ U.S. market investment annually
- Projected to grow to $10-15 billion by 2020
  - Scalable for CPP
- ***What's in your state's CPP plan?***

Source: Bloomberg New Energy Finance, "Sustainable Energy in America Factbook"

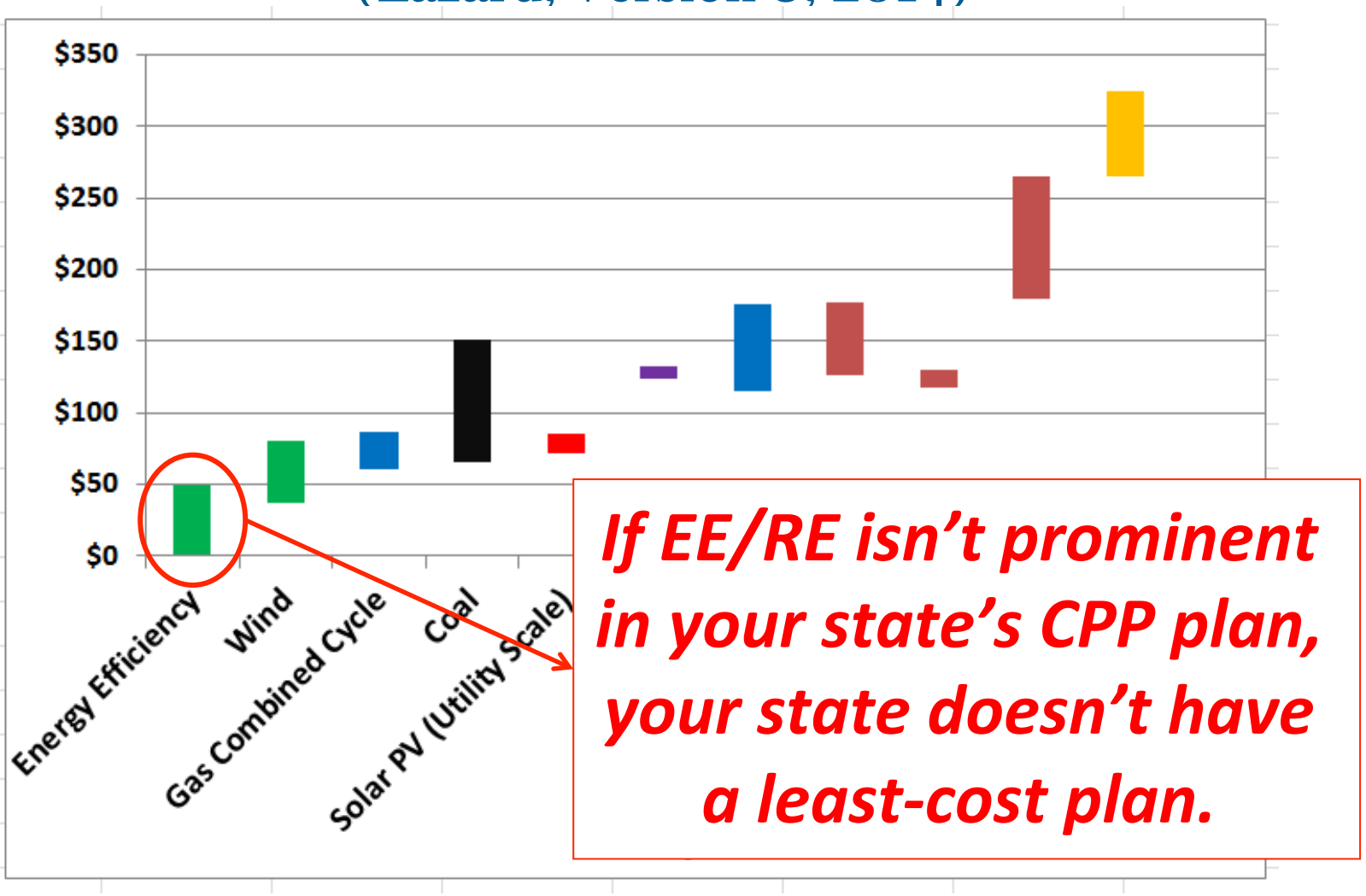
Other Ways to Simplify EE Emissions Quantification

- "**Mobile Source Analogy**" for vehicle reductions
  - Why not for EE too?
- "**Deemed Energy Savings**" for good EE programs…
  - Why not apply to EE emissions reductions?
- "**AP-42 Emission Factors**" hierarchy approach…
  - Why not apply to EE emissions reductions?
- **Modeling**: EPA provides the MOVES model for states to assess vehicle emissions…
  - Why not a similar model for EE (AVERT?)
- "**Rule Effectiveness**" imposes conservative results
- *REMEMBER: §111(d) is NOT a SIP; far greater flex.*

EE and Renewable Energy Certificate Tracking Systems in North America



Levelized Cost of Energy ($/MWh)
(Lazard, Version 8, 2014)



Thank You for Your Time and Attention

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts focused on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies to:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raponline.org

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Clean Power Plan Tools for States

Meegan Kelly
July 31, 2015

The American Council for an Energy-Efficient Economy (ACEEE)

- ACEEE is a 501(c)(3) nonprofit that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors
- 50 staff; headquarters in Washington, D.C.
- Focus on end-use efficiency in industry, buildings, & transportation
- Other research in economic analysis; behavior; energy efficiency programs; & national, state, & local policy
- Funding:
  - Foundation Grants (52%)
  - Contract Work & Gov't. Grants (20%)
  - Conferences & Publications (20%)
  - Contributions & Other (8%)

www.aceee.org/@ACEEEdc

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Snapshot of 111(d) work

- *Change is in the Air* study
  - http://aceee.org/research-report/e1401
- Comments to EPA
  - ACEEE: http://aceee.org/sites/default/files/clean-power-plan-comments_0.pdf
  - Joint Comments on EM&V: http://www.neep.org/sites/default/files/resources/Joint_EE_Stakeholder_EMV_EPA-HQ-OAR-2013-0602.pdf
- Coordination with "3N" group
  - National Association of State Energy Officials (NASEO)
  - National Association of Regulatory Utility Commissioners (NARUC)
  - National Association of Clean Air Agencies (NACAA)
- Technical assistance and tools for states

I'm going to talk about…

Three tools:

1. State and Utility Pollution Reduction (SUPR) Calculator
2. Compliance Template Series
3. NASEO/ACEEE State 111(d) Resource Hub

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Purpose of State Utility Pollution Reduction (SUPR) calculator

WHAT IT DOES: Assist states in understanding the cost and pollution reduction potential of different compliance options

WHO IT'S FOR: Policymakers, state governments, utility operators, and other stakeholders weighing options to comply with EPA's Clean Power Plan

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How it works

- User chooses from 19 different policies and technologies to build a "compliance scenario"
- Results are for 2016–2030
- State specific results for:
  - NO_x SO_x and CO_2 reductions
  - Energy savings (MWh)
  - Costs ($)

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State selected	Illinois

Step 4

Detailed results →

Selected measures

1.	Combined heat and power (CHP) (high)
2.	Annual 1.5% energy savings target
3.	Building energy codes (high)
4.	ESCO programs
5.	Utility-scale solar PV (low)
6.	Onshore wind (low)
7.	-
8.	-
9.	-
10.	-

Summary results

	2020	2025	2030
Cumulative NOx reductions (tons)	33,100	111,100	232,800
Cumulative SO2 reductions (tons)	135,800	443,200	919,800
Cumulative CO2 reductions (tons)	52,692,000	181,070,000	384,019,000
Annual CO2 reductions (tons)	42,324,000	157,740,000	347,728,000
Cummulative net cost (million 2011$)	2,361	2,734	(1,597)
Cumulative energy saved (MWh)	34,066,700	137,984,300	310,605,500
Annual energy saved (MWh)	12,009,000	26,508,000	39,411,000

*Results are for all selected measures combined reported cumulatively.

What does this mean?

Number of 100 MW power plants offset by 2030	533
Savings from energy efficiency measures by 2030 (million 2011$)	$30,151
Percent of EPA's goal achieved by selected measures	75%

Helpful definitions :

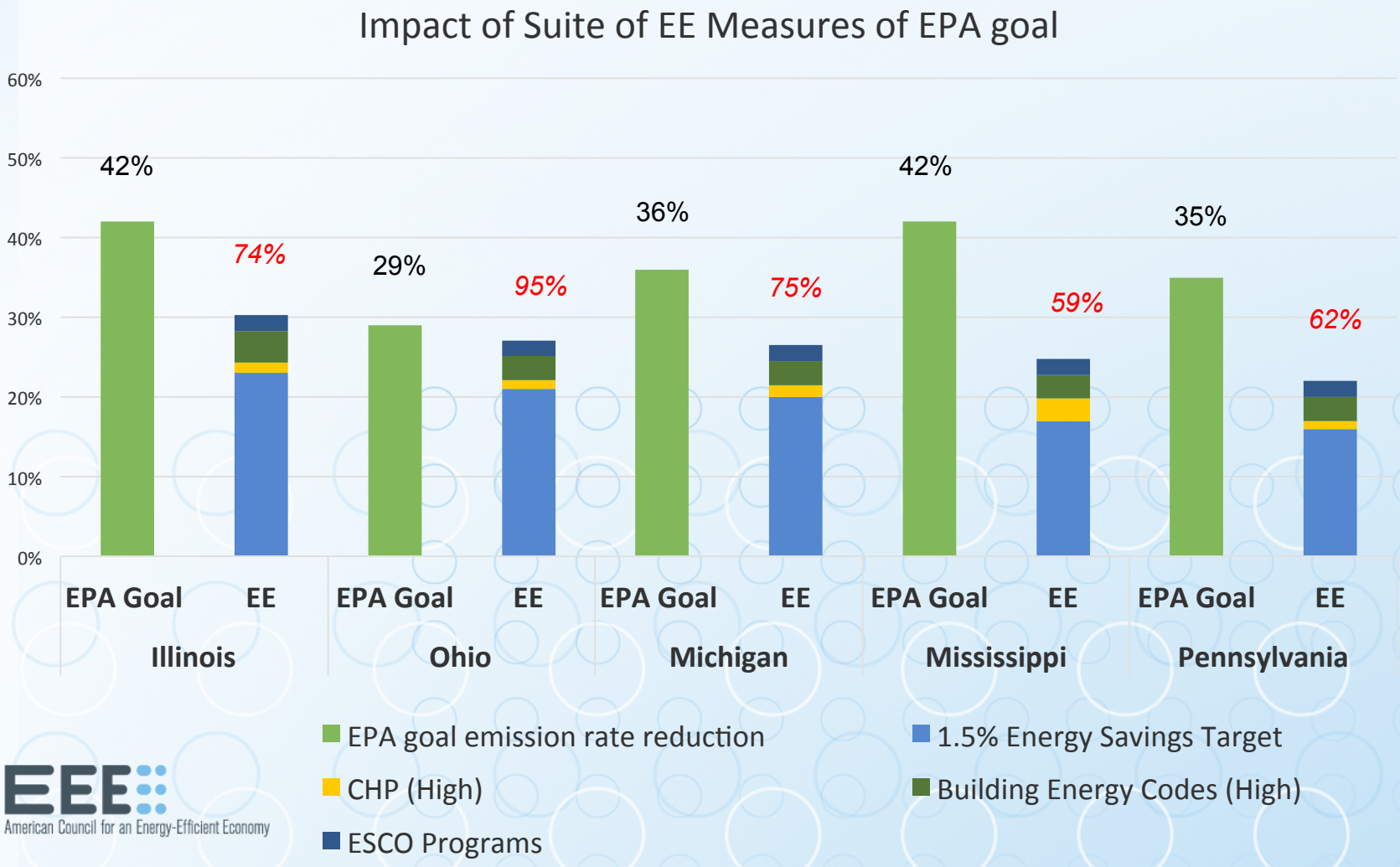
Annual savings: the savings in a given year from all the measures that have been installed under a policy or program in prior years and in that year that are still saving energy (and CO_2, NOx and SOx).

Cumulative savings: all the savings under a policy or program up through a given year, the sum of annual savings through that year.

Cumulative cost: all the spending on a policy or program up through a given year, the sum of all of the money spent through that year.

Cumulative net cost: all of the spending on a policy or program up through a given year minus all of the avoided spending through that same year. The spending on the program minus any avoided spending from lower energy consumption/lower energy bills.

SUPR Selection: Suite of four EE Measures



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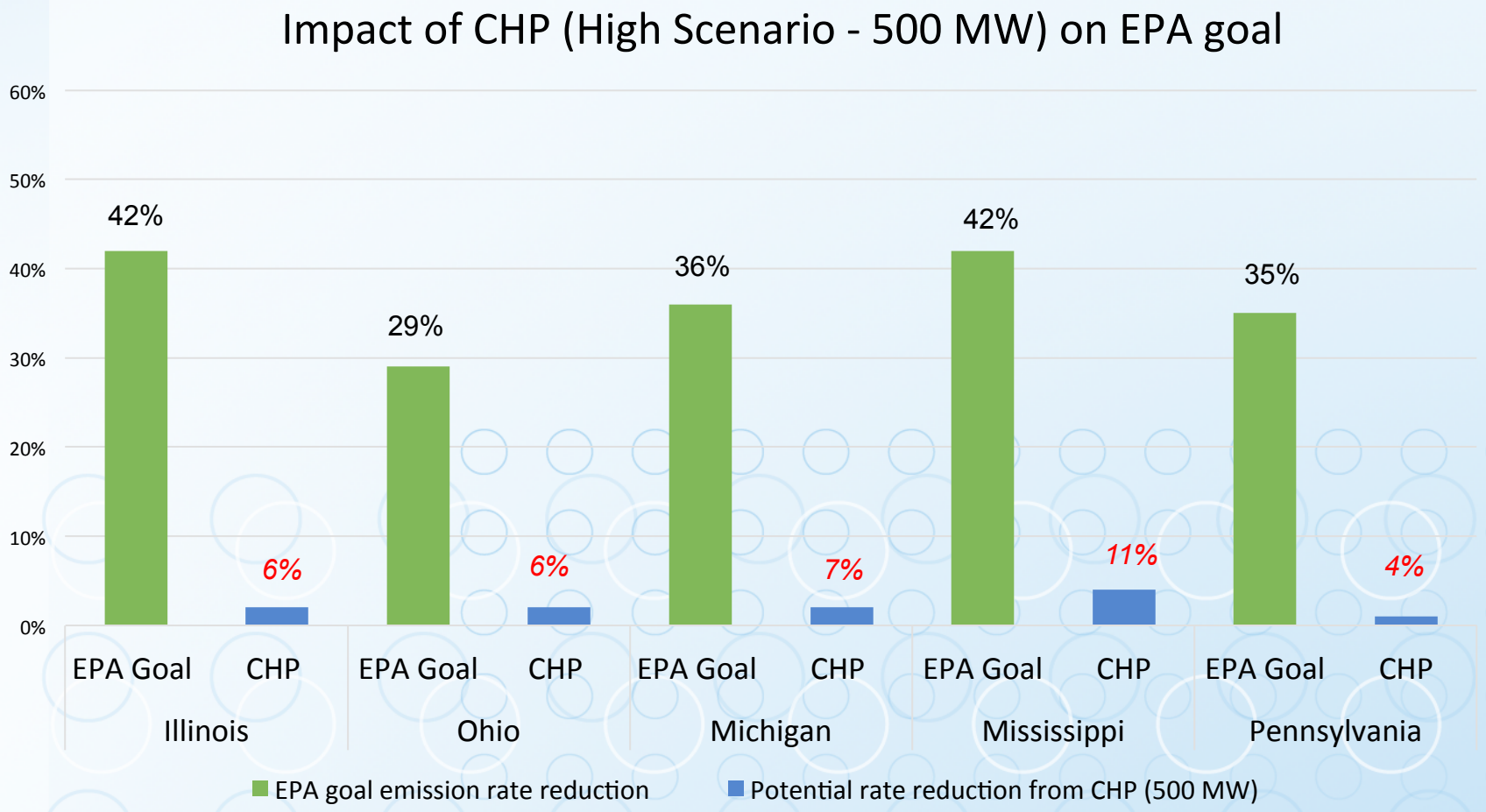
Is CHP an attractive option in my state?



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Compliance Template Series

We looked at existing EPA guidance, the proposed rule, experience with EE and approved state implementation plans (SIPs)

Templates are our *best guess* as to how various EE policies or programs might be documented in a state compliance plan

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Compliance Template Series

Each template includes:

- Background/overview of key components
- A list of all the elements that should likely be addressed
- Instructions for how a state might address each element
- A hypothetical submission/case study

Topics include:

- Building codes - http://aceee.org/white-paper/111d-building-codes-template
- Financing programs - http://aceee.org/white-paper/cpp-financing-template
- Combined heat and power - http://aceee.org/white-paper/cpp-chp
- Energy savings target (eg. EERS)
- Multifamily programs

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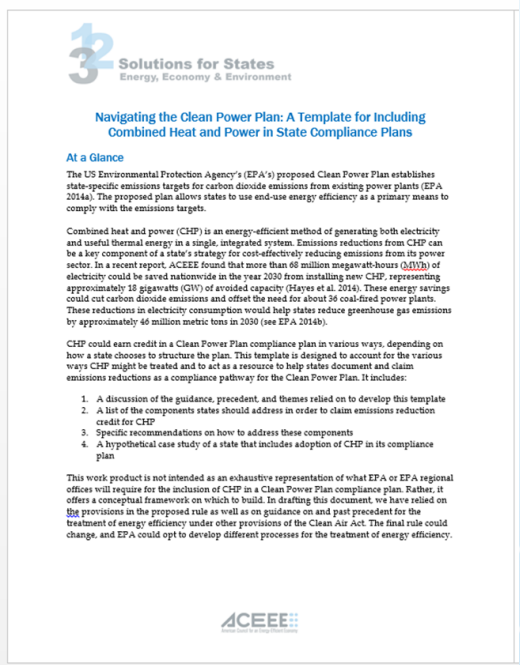
CHP Template & Case Study

These are the “questions” we think need to be “answered” (and we provide recommended answers):

- Brief Overview of CHP Compliance Measure
- Discussion of Measure Technology
- Quantification of Emissions Benefits Potential
- Implementation
- Monitoring and Reporting
- Enforcement
- Verification and Quantification



Solutions for States
Energy, Economy & Environment

Navigating the Clean Power Plan: A Template for Including Combined Heat and Power in State Compliance Plans

At a Glance

The US Environmental Protection Agency's (EPA's) proposed Clean Power Plan establishes state-specific emissions targets for carbon dioxide emissions from existing power plants (EPA 2014a). The proposed plan allows states to use end-use energy efficiency as a primary means to comply with the emissions targets.

Combined heat and power (CHP) is an energy-efficient method of generating both electricity and useful thermal energy in a single, integrated system. Emissions reductions from CHP can be a key component of a state's strategy for cost-effectively reducing emissions from its power sector. In a recent report, ACEEE found that more than 68 million megawatt-hours (MWh) of electricity could be saved nationwide in the year 2030 from installing new CHP, representing approximately 18 gigawatts (GW) of avoided capacity (Hayes et al. 2014). These energy savings could cut carbon dioxide emissions and offset the need for about 38 coal-fired power plants. These reductions in electricity consumption would help states reduce greenhouse gas emissions by approximately 46 million metric tons in 2030 (see EPA 2014b).

CHP could earn credit in a Clean Power Plan compliance plan in various ways, depending on how a state chooses to structure the plan. This template is designed to account for the various ways CHP might be treated and to act as a resource to help states document and claim emissions reductions as a compliance pathway for the Clean Power Plan. It includes:

1. A discussion of the guidance, precedent, and themes relied on to develop this template
2. A list of the components states should address in order to claim emissions reduction credit for CHP
3. Specific recommendations on how to address these components
4. A hypothetical case study of a state that includes adoption of CHP in its compliance plan

This work product is not intended as an exhaustive representation of what EPA or EPA regional offices will require for the inclusion of CHP in a Clean Power Plan compliance plan. Rather, it offers a conceptual framework on which to build. In drafting this document, we have relied on the provisions in the proposed rule as well as on guidance on and past precedent for the treatment of energy efficiency under other provisions of the Clean Air Act. The final rule could change, and EPA could opt to develop different processes for the treatment of energy efficiency.

ACEEE

We provide sample text for each of the elements using a hypothetical scenario in Mississippi as an example. The entire case study is only about 5 pages.

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State 111(d) Resource Hub

http://111d.naseo.org/

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Purpose of the Hub

WHAT IT DOES: Acts as a clearinghouse of tools/resources focused on energy efficiency and Clean Power Plan compliance strategy and planning

WHO IT'S FOR: Policymakers, state governments, agencies, and other stakeholders seeking information about energy efficiency as Clean Power Plan option

ACEEE Resources

NASEO State 111(d) Resource Hub

- http://111d.naseo.org/

ACEEE Compliance Templates Series

- All Templates: http://aceee.org/topics/section-111d-clean-air-act
- CHP Template: http://aceee.org/white-paper/cpp-chp

State and Utility Pollution Reduction Calculator

- http://aceee.org/state-and-utility-pollution-reduction-supr

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Combined Heat and Power as a Compliance Pathway

State Template and Policy Options

Bruce Hedman, Institute for Industrial Productivity
July 31, 2015

Institute for Industrial Productivity

D|G/A David Gardiner and Associates

State Template and Policy Options

- Joint product of Institute for Industrial Productivity (IIP) and David Gardiner & Associates (DGA)
- Sponsored by the American Gas Association (AGA), American Chemistry Council (ACC) , and American Forest and Paper Association (AF&PA)
- Provides tools and identifies resources that states can use to evaluate CHP as a compliance option
- Does not endorse any particular approach for any state - actual plans will vary dependent upon state-specific factors and determinations.
- Not every policy option is appropriate for every state.

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CHP as a Compliance Option

- CHP offers air quality, economic and reliability benefits
- CHP is a cost-effective energy-efficiency resource available in all states
- CHP produces low-cost CO_2 reductions
- CHP is included in many existing state efficiency and clean-energy programs
- CHP meets EPA's requirements for an approvable compliance option

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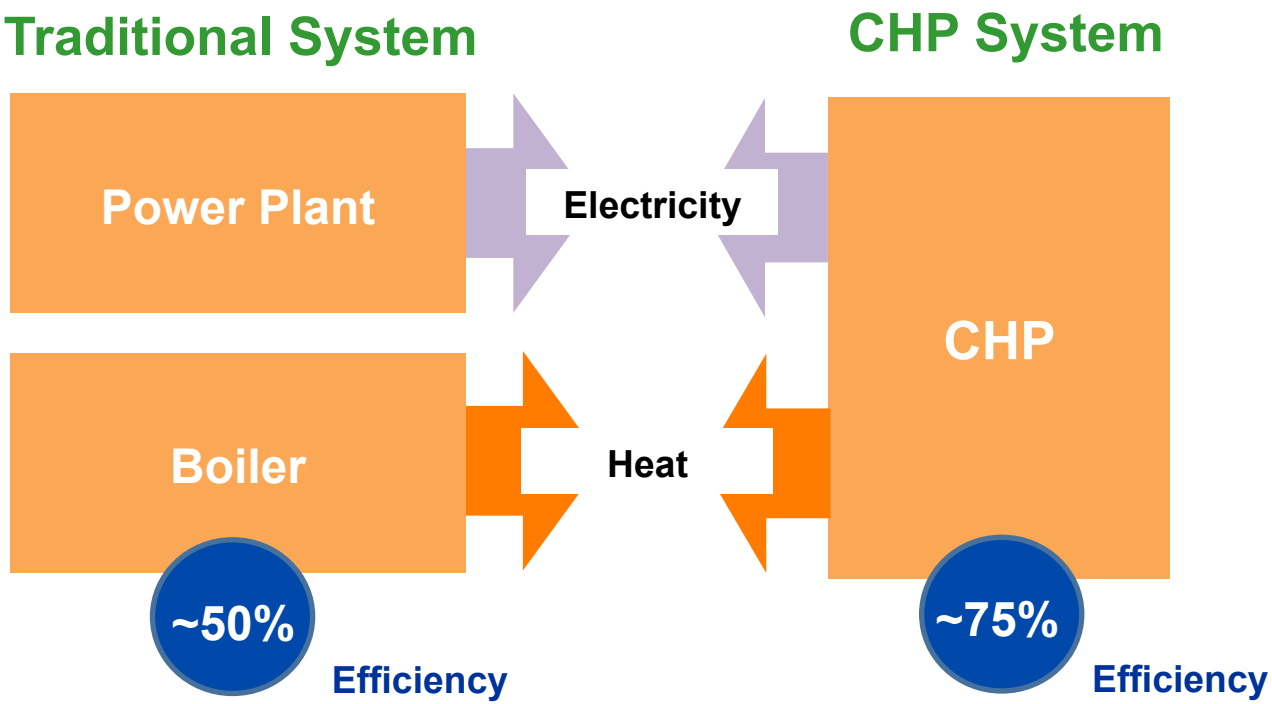
CHP Recaptures the Waste Heat from Power Generation, Increasing Overall Efficiency…..



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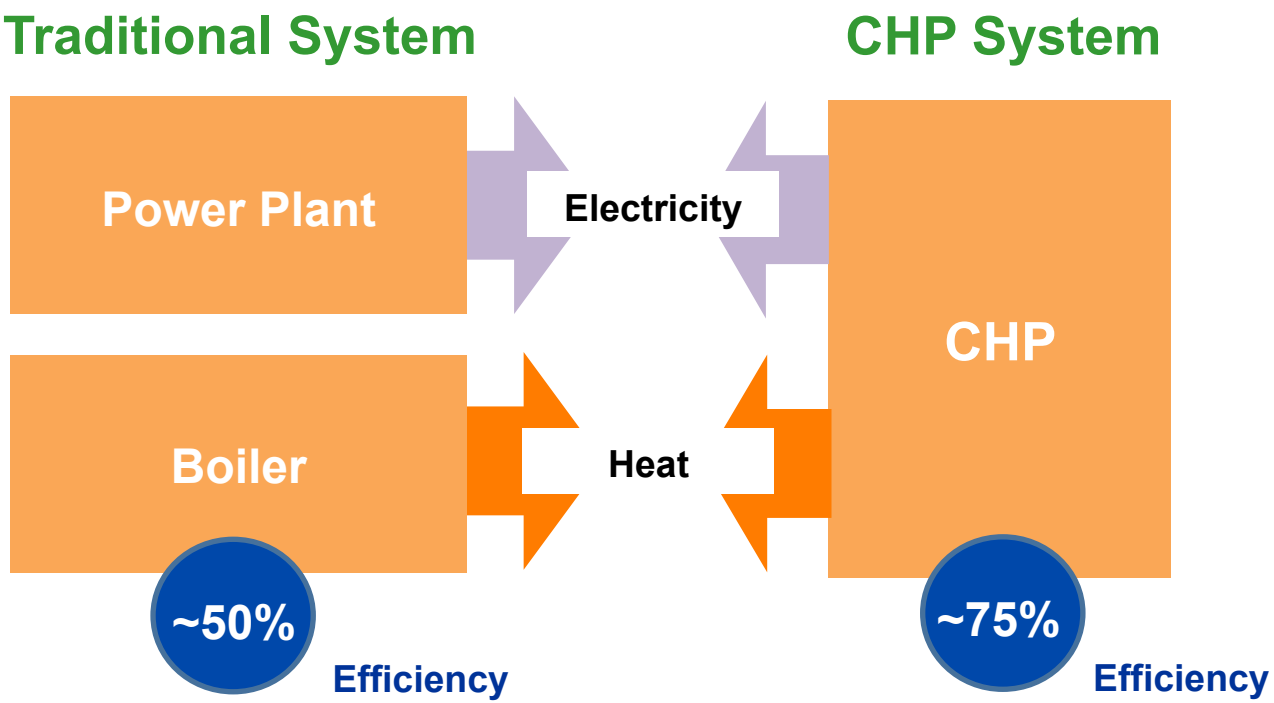
...and Reducing CO_2 Emissions



30 to 55% less CO_2 emissions

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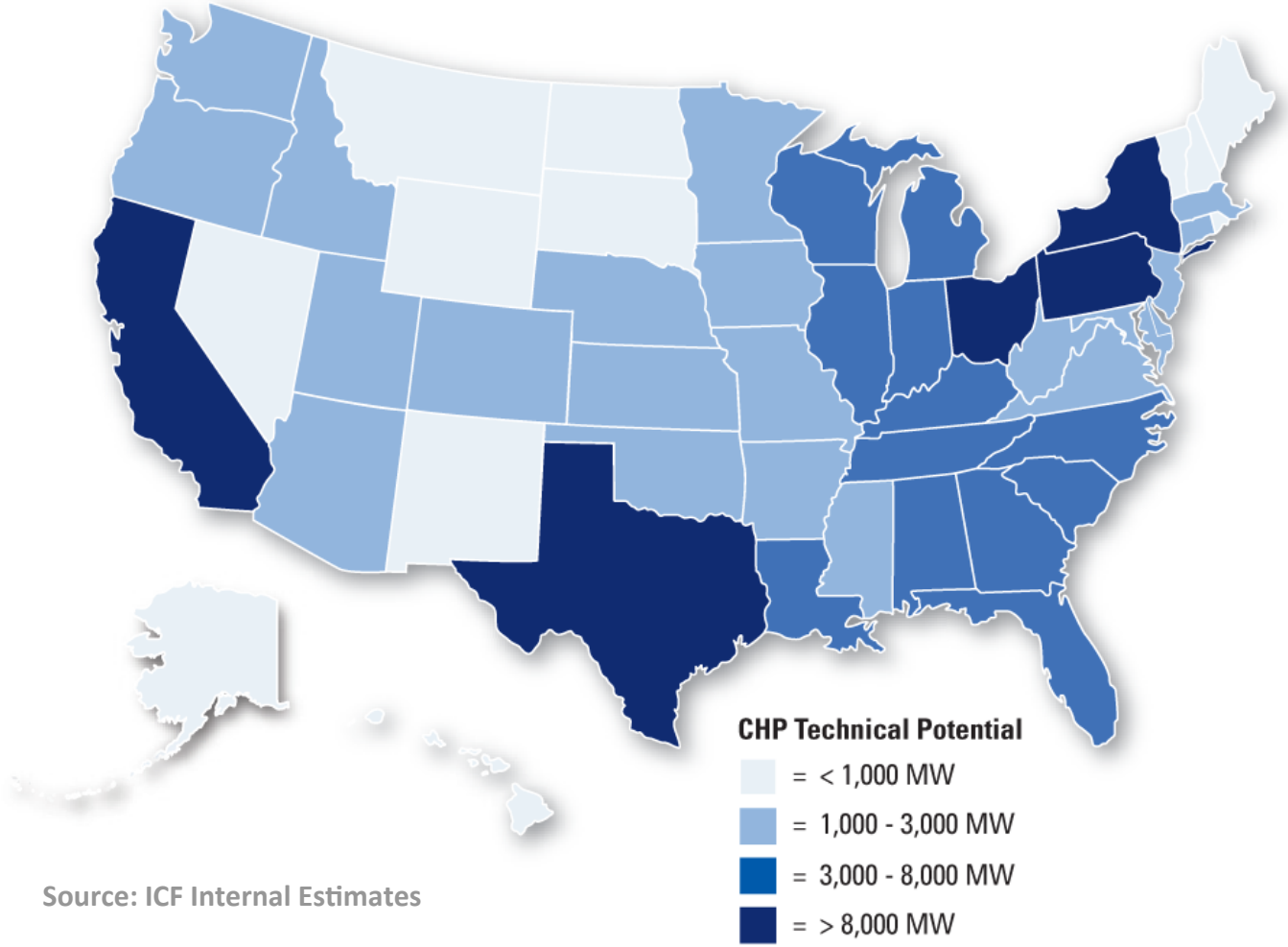
The Remaining Potential for CHP Is Significant



Source: ICF Internal Estimates

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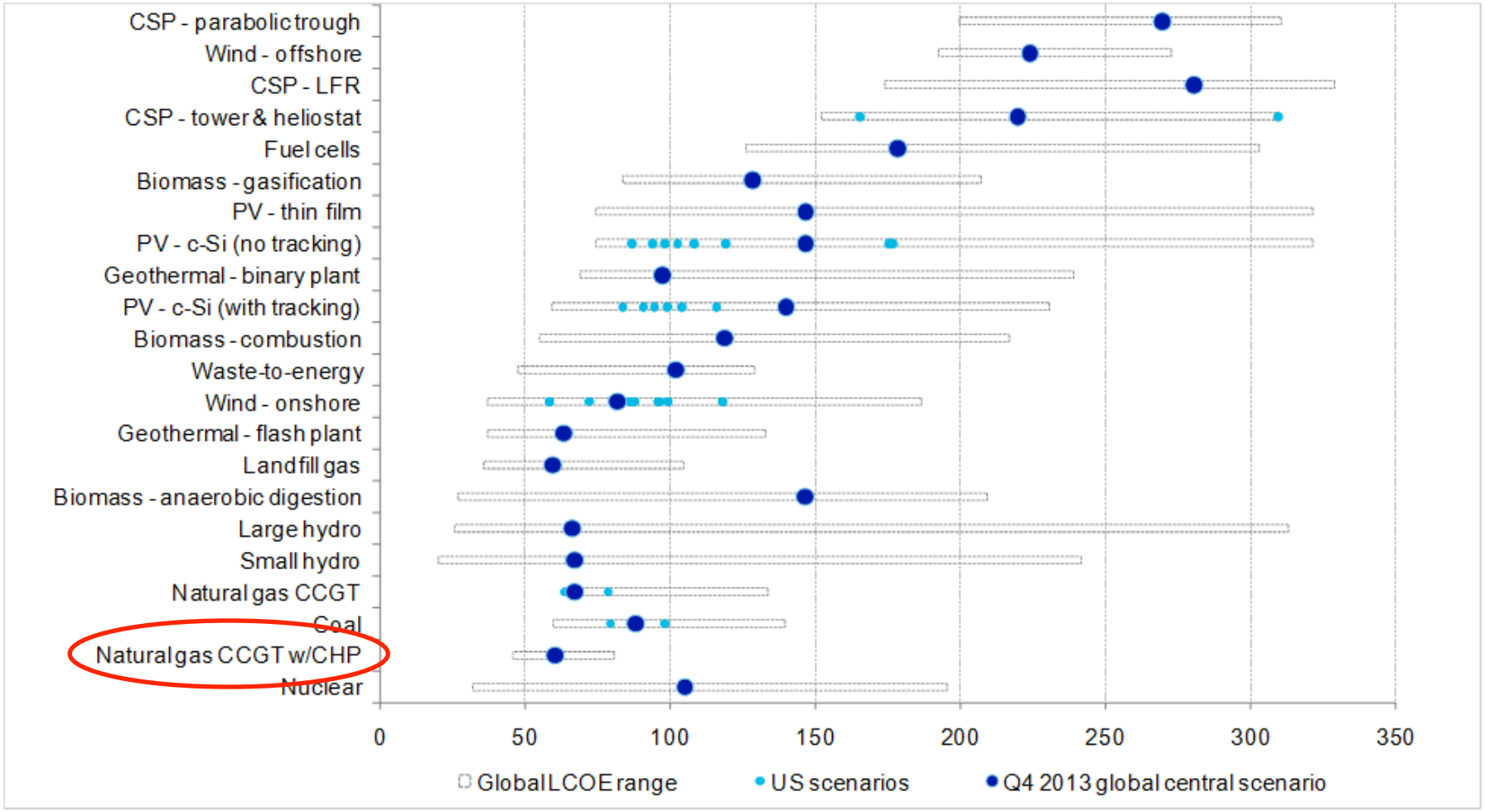
CHP Is a Cost-Effective Resource



Source: Bloomberg Sustainable Energy Factbook 2014

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State Template and Policy Options -TOC

- Overview of CHP
- CHP in the Clean Power Plan – Mass vs Rate-Based
- Compatibility with EPA Requirements
  - ✓ Enforceability
  - ✓ Performance
  - ✓ Measurable, Quantifiable, and Verifiable
  - ✓ Accountable
- Steps Towards a CHP Compliance Module
- Suggested Elements of a CHP Compliance Pathway
- Appendices

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Appendices

- Menu of Policy Options
- Enforceability of CHP Programs under the Clean Power Plan
- Calculation of Energy and CO_2 Savings from CHP
- Key Resources

General Approach to CHP Pathway

- Build on existing CHP and energy efficiency programs
  - States without programs can adopt best practices from other states (Maryland, Massachusetts, Illinois, etc.)
- Create something new for medium/large industrial customers
  - Offer voluntary market-based options
    - Allow CHP to generate emission reduction credits
    - Standard Offers for purchase of emission reduction credits
    - State or regional emission reduction certification processes
    - Layer emission credits with utility program incentives
    - Explore utility/industrial partnerships

Mass v. Rate-Based Approach:

Rate-Based Approach

- Sets emissions-rate targets (e.g., lbs / MWh)
- CHP systems generate electricity at a lower effective emissions rate
- CHP may be able to directly derive value for its emissions reductions

Mass-Based Approach

- Sets emissions targets (e.g., tons of CO_2)
- When properly accounted for, CHP systems should yield fewer total emissions
- Potential for "cap and trade" or portfolio approach
- Careful framework design will be needed for full CHP participation

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General Criteria for State Plan Approval

- Performance
  - State must show how it will comply with limits, including how individual measures contribute to meeting goals
- Enforceability
  - State emissions limits must be enforceable
  - Does not mean that individual emissions reduction measures or strategies are enforceable
- Accountability
  - A process to report on plan implementation, emissions outcomes, and identified corrective measures
- Measurable
  - Quantifiable and verifiable, established EM&V protocols

Policy Options that Support CHP

- Financing
  - Grants and Loans
  - Incentive Programs
- Regulatory Relief
  - Streamlined Permitting
  - Standby/back-up rates
- Market Support
  - Critical Infrastructure
  - Portfolio Standards

Compliance Issues for CHP

- How do you calculate the net CO_2 savings?
  - How do you calculate CHP incremental emissions?
  - How do you calculate savings (i.e., what grid emissions are displaced)?
- Do acceptable EM&V protocols exist?
- How can CHP investment be encouraged?
  - Within ratepayer energy-efficiency programs
  - Voluntary programs outside of rate-payer programs

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Report:

http://www.iipnetwork.org/New-Report-CHP

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